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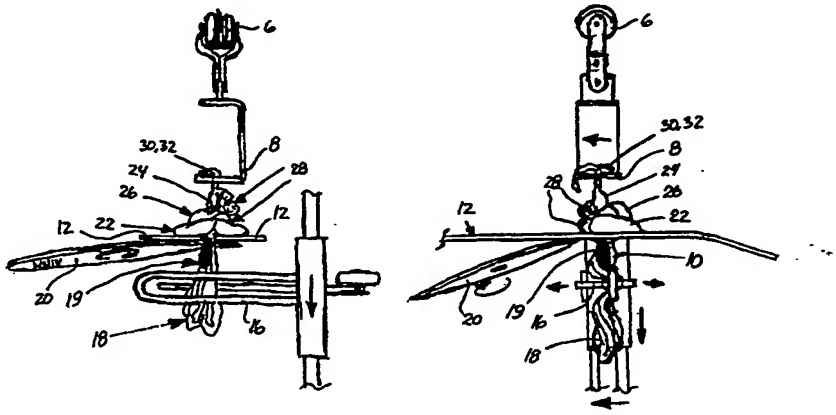
(54) Title: METHOD AND APPARATUS FOR SEPARATING INTESTINE PACKS FROM SLAUGHTERED POULTRY, PARTICULARLY BROILERS



(57) Abstract

A method and apparatus for separating intestine packs (10) from slaughtered poultry, in particular broilers, and where intestine packs (10) are suspended from intestine clips (8), where the intestine pack (10) with arbitrary orientation is inserted between mainly horizontal, curved guide plates (12) extending along the periphery of a reversing wheel (4) in such a way that proventriculus (24), gizzards (26), heart/lungs (28) and liver (22) are disposed over the guide plates (12), and that the intestine pack (18) with gall bladder (19) is disposed at the underside of the guide plates (12), that the intestine pack (18) is clamped between clip brackets (16) rotating about the reversing wheel (4) and which is successively displaced downward for exerting a downward directed pull in the intestine pack (18) while the intestine pack (10) passes by a rotating cutter (20) cutting free the intestine pack (18) and the gall bladder (19) from the liver (22), that the remaining intestine pack (34), i.e. proventriculus (24), gizzard (26), heart/lungs (28) and liver (22), is released, preferably over a funnel (36), and passed on to a second apparatus for further separation, namely cutting free of heart/lungs (28) and subsequent scraping off the liver (22).

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Method and Apparatus for Separating Intestine Packs from Slaughtered Poultry, particularly Broilers

The present invention concerns a method for separating intestine packs from slaughtered poultry, in particular broilers, and of the kind indicated in the preamble of claim 1.

EP-B1-0 587 253 describes a method and a device for separation of one or more internal organs or a part thereof from a collection of mutually connected internal organs from a slaughtered animal, in particular a slaughtered bird, where the following method steps are indicated: Fixing of at least one of the organs, a part thereof or a connection between the organs when the collection is located inside or partly outside the body of the slaughtered animal, and removal of the collection from the body while the fixed condition is maintained, the method being characterised by the following steps: Breaking of one or more tissue connections in the collection based on the spatial orientation of the collection which is determined by its continual fixed condition, the device comprising devices for fixing at least one of the organs, a part thereof or a connection between the organs when collection is situated inside or partly outside the body of the slaughtered animal, which devices for fixing are a part of a transport system, the device being characterised in that the transport system is arranged for advancing the organ taken out of the body while maintaining the fixed condition along a predetermined path and in a certain spatial orientation to a process station for separating at least one organ or a part thereof from the collection based on the spatial orientation of the collection which is determined by its continually fixed condition.

The invention has the purpose of indicating an improved method for separating intestine packs from slaughtered poultry, particularly broilers, and which enables both automating separation of certain intestine parts and also to reduce the risk of cross-contamination between intestine packs from respective broilers.

The method according to the invention is characterised in that the intestine pack with arbitrary orientation is inserted between mainly horizontal, curved guide plates extend-

ing along the periphery of a reversing wheel in such a way that proventriculus, gizzards, heart/lungs and liver are disposed over the guide plates, and that the intestine pack with gall bladder is disposed at the underside of the guide plates, that the intestine pack is clamped between clip bracket rotating about the reversing wheel and which is successively displaced downward for exerting a downward directed pull in the intestine pack while the intestine pack passes by a rotating cutter cutting free the intestine pack and the gall bladder from the liver, that the remaining intestine pack, i.e. proventriculus, gizzard, heart/lungs and liver, is released and passed on to a second apparatus for further separation.

By means of simple mechanical measures there is hereby achieved a considerably improved method which enables automating separation of certain intestine parts with arbitrary orientation of the intestine packs and also to reduce the risk of cross-contamination between intestine packs from respective broilers.

It is considered particularly important that a downward directed pull is exerted on the intestine pack so that the gall bladder is pulled downward in relation to the liver so that it is ensured that the connection between the gall bladder and the liver may be cut free of the liver very close to it by means of said stationary rotating cutter disposed along the underside of the guide plates, so that heart/lung and liver together are not contaminated with gall.

The method according to the invention may suitably comprise following method steps, that the hard solid part of the remaining intestine pack, the gizzard, is caught hold of and fixed in a guide groove preferably having V-shaped cross section and being open downwards, so that the intestine pack is hanging down from the guide groove, and that the intestine pack e.g. by means of a carrier-provided conveyor is inserted between preferably mutually parallel, mainly horizontal guide rods spaced apart from the guide groove in such a way that heart/lungs are disposed at the underside of the guide rods, that these are successively twisted to mutual vertical position and continue in straight, mainly vertical guide plates so that heart/lungs are disposed at one side of the guide plates, and that the heart/lungs are cut free from the remaining intestine pack by pass-

ing a stationary, rotating cutter placed along the opposite side of the guide plates after which the remaining part of the intestine pack is inserted between straight, mainly horizontal guide plates that are disposed immediately under the V-shaped guide groove, which guide plates are continued in a downward curved path so that the liver is scraped off from the remaining intestine pack, namely gizzard, proventriculus, spleen, crop and gullet, which is then passed out of the guide groove and passed further on, e.g. to a gizzard separating apparatus.

The invention also concerns an apparatus for performing the method according to the invention, the apparatus being characterised in that it mainly comprises horizontal, curved guide plates extending along the periphery of the reversing wheel, the guide plates being arranged for successively receiving and guiding said intestine packs in such a way that proventriculus, gizzard, heart/lungs and liver are disposed over the guide plates, and that the intestine pack with gall bladder is disposed at the underside of the guide plates, clip brackets which are arranged to rotate about the reversing wheel with the same mutual distance as the intestine packs, and which are arranged to grip and clamp the intestine pack and to be successively displaced downward in order to exert a downward directed pull in the intestine pack, a stationary rotatable cutter along the underside of the guide plates for cutting free the intestine pack with gall bladder from the liver.

A further apparatus according to the invention is furthermore preferably designed so that it comprises a guide groove which is open downwards and preferably has V-shape, which guide groove is arranged to catch and fix the hard, solid part of the remaining intestine pack, the gizzard which is advanced with mutual spacing in the guide groove by means of a carrier-provided conveyor, preferably round, mutual parallel, mainly horizontal guide rods spaced apart from the guide groove for fixing the heart/lungs, the guide rods being successively mutually twisted to a mainly vertical position and continued in straight, mainly vertical guide plates, a stationary rotatable cutter along the opposite side of the guide plates for cutting free the heart/lungs from the remaining intestine pack, and straight, mainly horizontal guide plates disposed immediately under the V-shaped guide groove and continuing in a downward curved

path for scraping off the liver from the remaining intestine pack, namely gizzard, proventriculus, spleen, crop and gullet, which is then released and passed further on to e.g. a gizzard separating apparatus.

The invention is explained more closely in the following in connection with the drawing, on which:

Fig. 1 shows in principle a sketch for illustrating an embodiment for an apparatus for use in an introductory method step of the method for separating intestine packs according to the invention,

Fig. 2 shows a corresponding sketch of the embodiment shown in Fig. 1 in principle for an apparatus - shown from another side,

Fig. 3. shows a side view - partly in section - of an embodiment for an apparatus constructed in connection with a reversing wheel for use in the method step according to the invention, cf. Figs. 1 and 2,

Figs. 4-6 show plane views of an embodiment of a clip for use in fixing and stretching out the intestine pack of a intestine pack by the apparatus according to the invention shown in Fig 3,

Fig. 7 shows a side view of an embodiment of an apparatus for use by further separation of a intestine pack by secondary method steps according to the invention,

Figs. 8-13 shows sectional views for illustrating the method and the way of working step by step, of the apparatus according to the invention shown in Fig. 7.

The apparatus 2 shown in Figs. 1-6 is built up in a known manner in connection with a reversing wheel 4 for an overhead conveyor 6 with special intestine clips 8 by means of which intestine packs 10 after taking out from individual broilers is inserted between mainly horizontal, curved guide rails 12 that extend with mutual short spacing along the periphery of the reversing wheel 4 and a number of identical units 14, each comprising a clip bracket 16 arranged to catch hold of the intestine pack 18 of each intestine pack 10 and exert a downward directed pull in the intestine pack 18, as the clip brackets 16 are successively displaced downwards so that the intestine pack 18

including gall bladder 19 by passing a stationary, rotating cutter 20 in a safe way may be cut free from the liver 22 along the underside of the guide rails 12. Together with proventriculus 24, gizzard 26, heart/lungs 28, the liver 22 is located at the upper side of the guide rails 12 which is placed spaced apart from the intestine clip 8, which cf. Fig. 1 and 2 has caught hold of the gullet 30 between crop 32 and proventriculus 24.

The clip bracket 16 shown in detail in Figs. 4-6 is served by guide wheels 13, 15 and 17 which in a known way interact with guide grooves and/or rails along the periphery of the reversing wheel, so that the clip bracket 11,16 is activated for opening and closing for gripping around the intestine pack 18 and displacing on vertical guides 9, respectively, for successively performing said downward directed pull in the intestine pack 18 before the passage of the rotating cutter 20 by the intestine pack 10 for cutting free intestine pack 18 and gall bladder 19 from the liver 22.

The remaining part of the intestine pack 34 is subsequently freed from the intestine pack 8 - as shown in Fig. 7 - over a funnel 36 which continues in a V-shaped guide groove 38 with a first, downward sloping stretch 40. The V-shaped guide grov 38 has a central, longitudinal slit 42. When the remaining part of the intestine pack 34 via the funnel 36 is passed down into the V-shaped guide groove 38, the intestine pack 34, except for the solid, hard gizzard 26, will pass out through the slit 42 so that the intestine pack 34 hang down from the guide groove 38 - as shown in Fig. 8 which shows a view of the situation along the line A-A in Fig. 7.

The intestine packs 34 are then advanced in the guide groove 38 with mutual spacing by means of a carrier-provided conveyor 44. Shortly before the sloping stretch 40 of the guide groove 38 continue in a horizontal stretch 46, the intestine pack 34 is inserted between mutual parallel, round guide rods 48 spaced apart from the guide groove 38 in such a way that heart/lungs 28 are situated and fixed at the underside of the guide rods 48 - as shown in Fig. 9, cf. the line B-B in Fig. 7.

The guide rods 48 are subsequently twisted successively to mutual vertical position and continued - as shown in Fig. 10, cf. the line C-C in Fig. 7 - in vertical, straight

guide rails 50 along the opposite side of which a stationary rotating cutter 52 is disposed so that heart/lungs 28 are cut free from the intestine pack 34 at the passage of the rotating cutter 52 - as shown in Fig. 11, cf. the line D-D in Fig. 7.

Thereafter, the intestine pack 34 is inserted between horizontal guide rails 54 which - as shown in Fig. 2, cf. the line E-E in Fig. 7, and continuing in a downward curved part 56 so that the liver is scraped off the remaining intestine pack 34 which - as shown in Fig. 13, cf. the line F-F in Fig. 7 now consist of gizzard 24, proventriculus 24, crop 32, spleen 33 and gullet 30, and which subsequently is moved out of the guide groove 38 to further treatment, e.g. in a gizzard separating apparatus.

CLAIMS

1. A method for separating intestine packs from slaughtered poultry, in particular broilers, and where intestine packs (10) from individual broilers after removal are suspended from intestine clips (8), characterised in that the intestine pack (10) with arbitrary orientation is inserted between mainly horizontal, curved guide plates (12) extending along the periphery of a reversing wheel (4) in such a way that proventriculus (24), gizzards (26), heart/lungs (28) and liver (22) are disposed over the guide plates (12), and that the intestine pack (18) with gall bladder (19) is disposed at the underside of the guide plates (12), that the intestine pack (18) is clamped between clip bracket (16) rotating about the reversing wheel (4) and which is successively displaced downward for exerting a downward directed pull in the intestine pack (18) while the intestine pack (10) passes by a rotating cutter (20) cutting free the intestine pack (18) and the gall bladder (19) from the liver (22), that the remaining intestine pack (34), i.e. proventriculus (24), gizzard (26), heart/lungs (28) and liver (22), is released and passed on to a second apparatus for further separation.

2. A method for further separation according to claim 1, characterised in that the hard solid part of the remaining intestine pack (34), the gizzard (26), is caught hold of and fixed in a guide groove (38) preferably having V-shaped cross section and being open downwards, so that the intestine pack (34) is hanging down from the guide groove (38), and that the intestine pack e.g. by means of a carrier-provided conveyor (44) is inserted between preferably mutually parallel, mainly horizontal guide rods (48) spaced apart from the guide groove (38) in such a way that heart/lungs (28) are disposed at the underside of the guide rods (48), that these are successively twisted to mutual vertical position and continue in straight, mainly vertical guide plates (50) so that heart/lungs (28) are disposed at one side of the guide plates (50), and that the heart/lungs (28) are cut free from the remaining intestine pack (34) by passing a stationary, rotating cutter (52) placed along the opposite side of the guide plates (50) after which the remaining part of the intestine pack (34) is inserted between straight, mainly horizontal guide plates (54) that are disposed immediately under the V-shaped guide groove (38), which guide plates (54) are continued in a downward curved path

so that the liver (22) is scraped off from the remaining intestine pack, namely gizzard (26), proventriculus (24), spleen (33), crop (32) and gullet (30), which is then passed out of the guide groove (38) and passed further on, e.g. to a gizzard separating apparatus.

3. An apparatus for performing the method according to claim 1 and preferably arranged in connection with a reversing wheel (4) of an overhead conveyor (6), where intestine packs (10) are suspended from intestine clips (8), characterised in that it mainly comprises horizontal, curved guide plates (12) extending along the periphery of the reversing wheel (4), the guide plates (12) being arranged for successively receiving and guiding said intestine packs (10) in such a way that proventriculus (24), gizzard (26), heart/lungs (28) and liver (22) are disposed over the guide plates (12), and that the intestine pack (18) with gall bladder (19) is disposed at the underside of the guide plates (12), clip brackets (16) which are arranged to rotate about the reversing wheel (4) with the same mutual distance as the intestine packs (4), and which are arranged to grip and clamp the intestine pack (18) and to be successively displaced downward in order to exert a downward directed pull in the intestine pack (18), a stationary rotatable cutter (20) along the underside of the guide plates (12) for cutting free the intestine pack (18) with gall bladder (19) from the liver (22).

4. An apparatus for performing the method according to claim 2, characterised in that it comprises a guide groove (38) which is open downwards and preferably has V-shape, which guide groove (38) is arranged to catch and fix the hard, solid part of the remaining intestine pack (34), the gizzard (26) which is advanced with mutual spacing in the guide groove (38) by means of a carrier-provided conveyor (44), preferably round, mutual parallel, mainly horizontal guide rods (48) spaced apart from the guide groove (38) for fixing the heart/lungs (28), the guide rods (48) being successively mutually twisted to a mainly vertical position and continued in straight, mainly vertical guide plates (50), a stationary rotatable cutter (52) along the opposite side of the guide plates (50) for cutting free the heart/lungs (28) from the remaining intestine pack (34), and straight, mainly horizontal guide plates (54) disposed immediately under the V-shaped guide groove (38) and continuing in a downward curved path for

scraping off the liver (22) from the remaining intestine pack (34), namely gizzard (26), proventriculus (24), spleen (33), crop (32) and gullet (30), which is then released and passed further on to e.g. a gizzard separating apparatus.

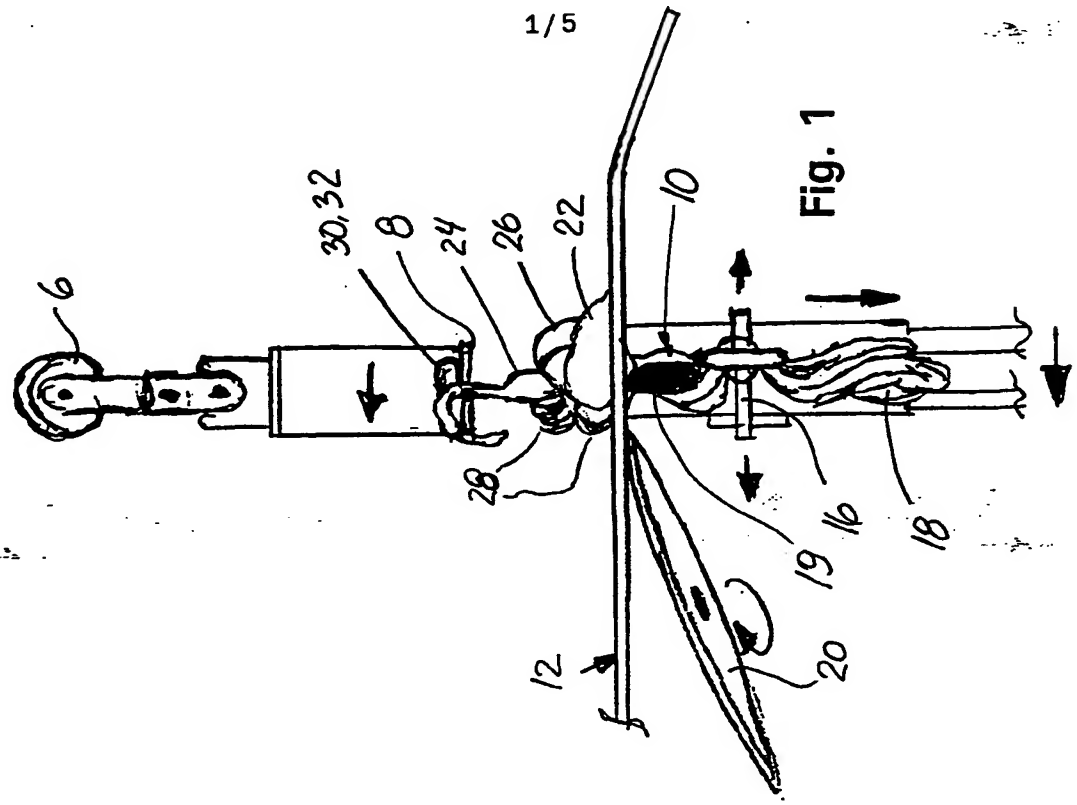
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Fig. 1

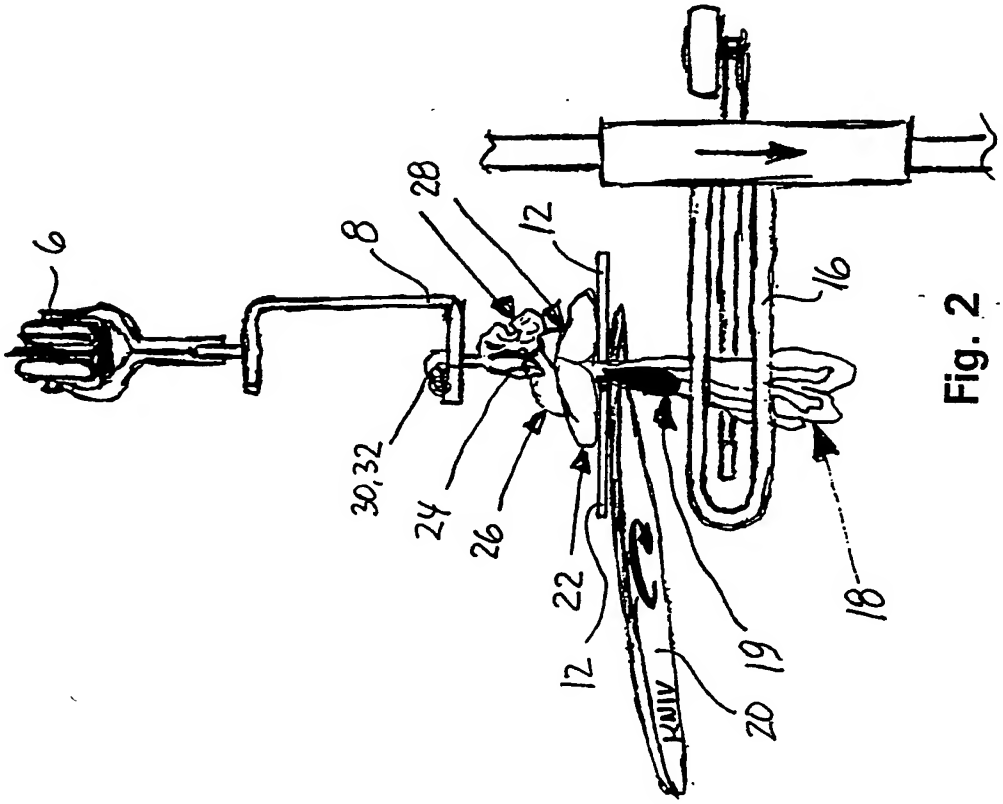
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Fig. 2

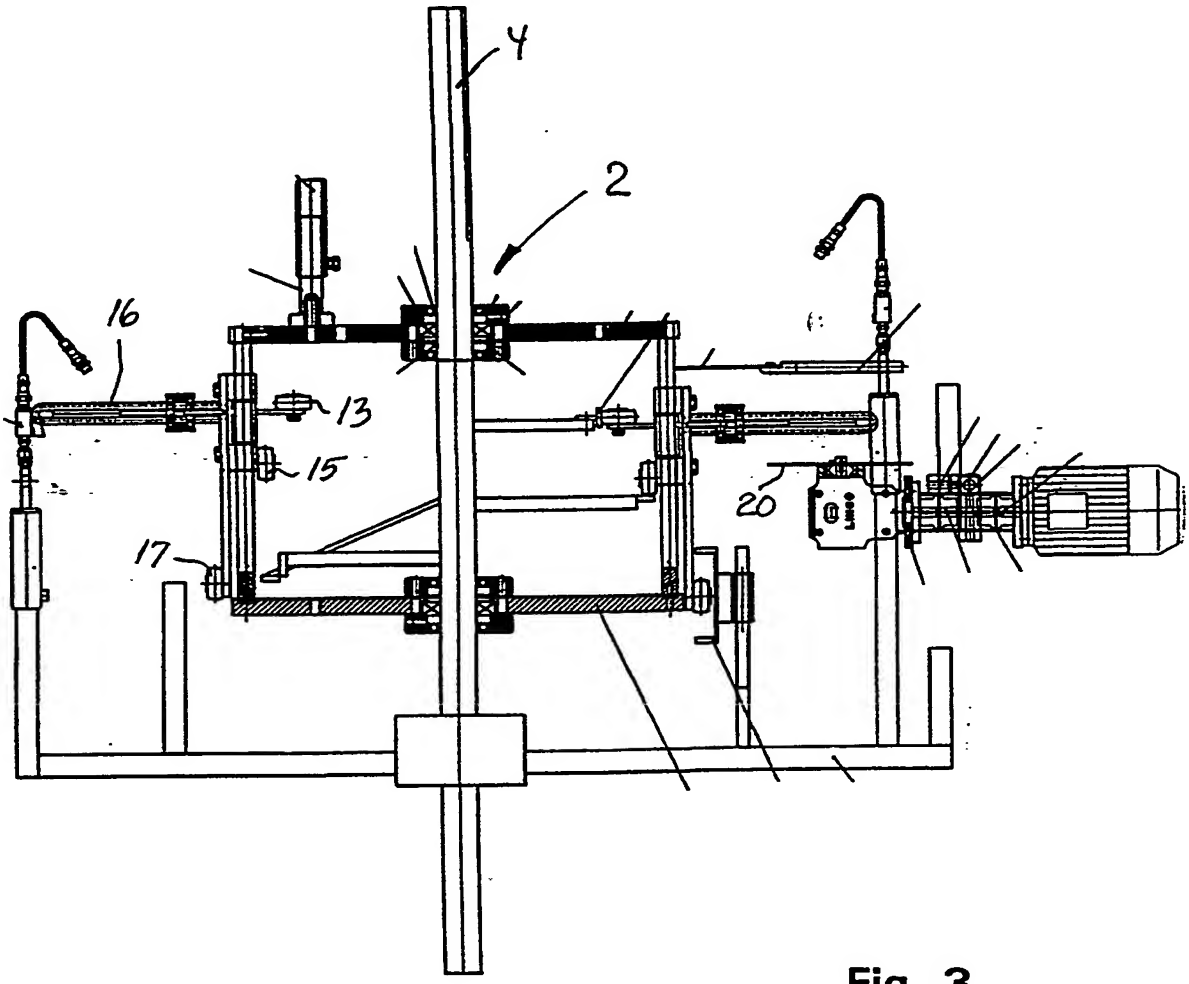

Fig. 3

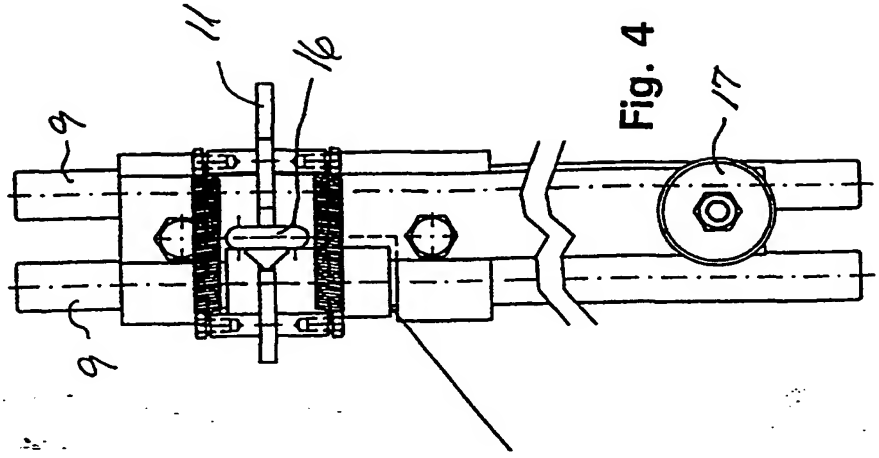

Fig. 4

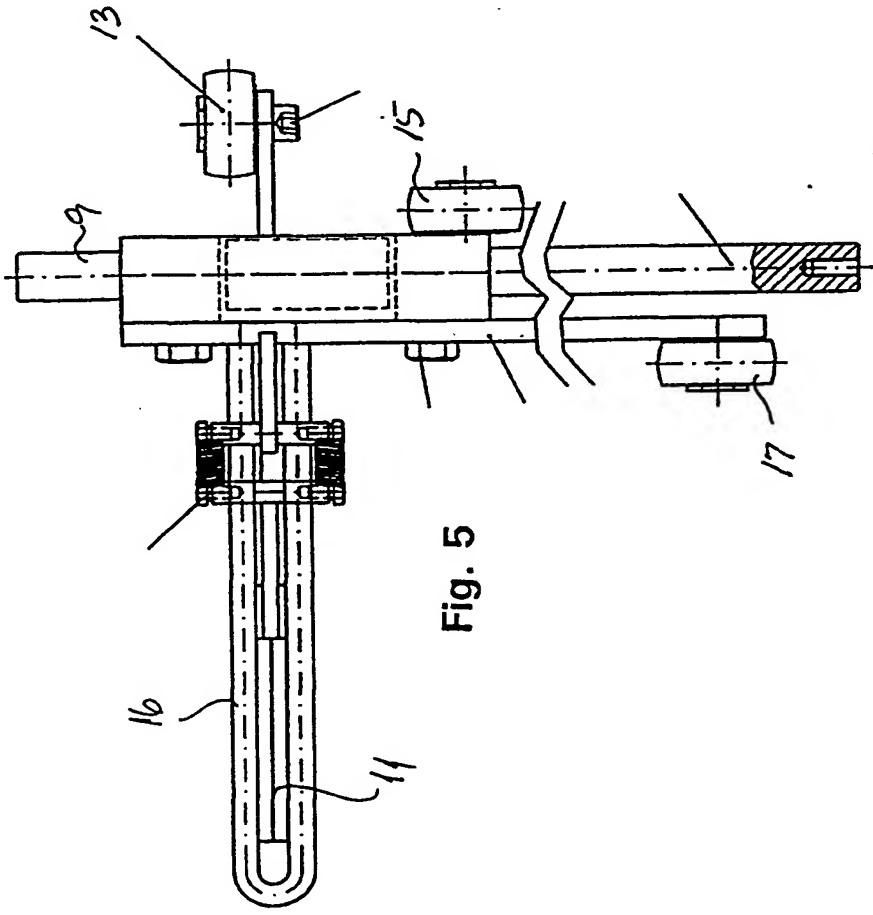

Fig. 5

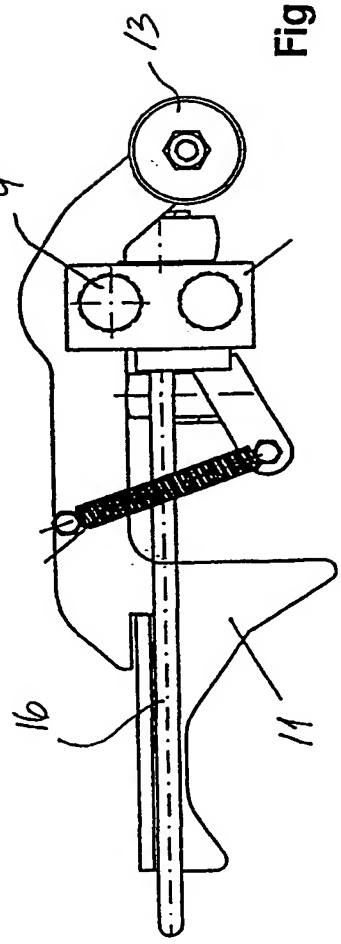

Fig. 6

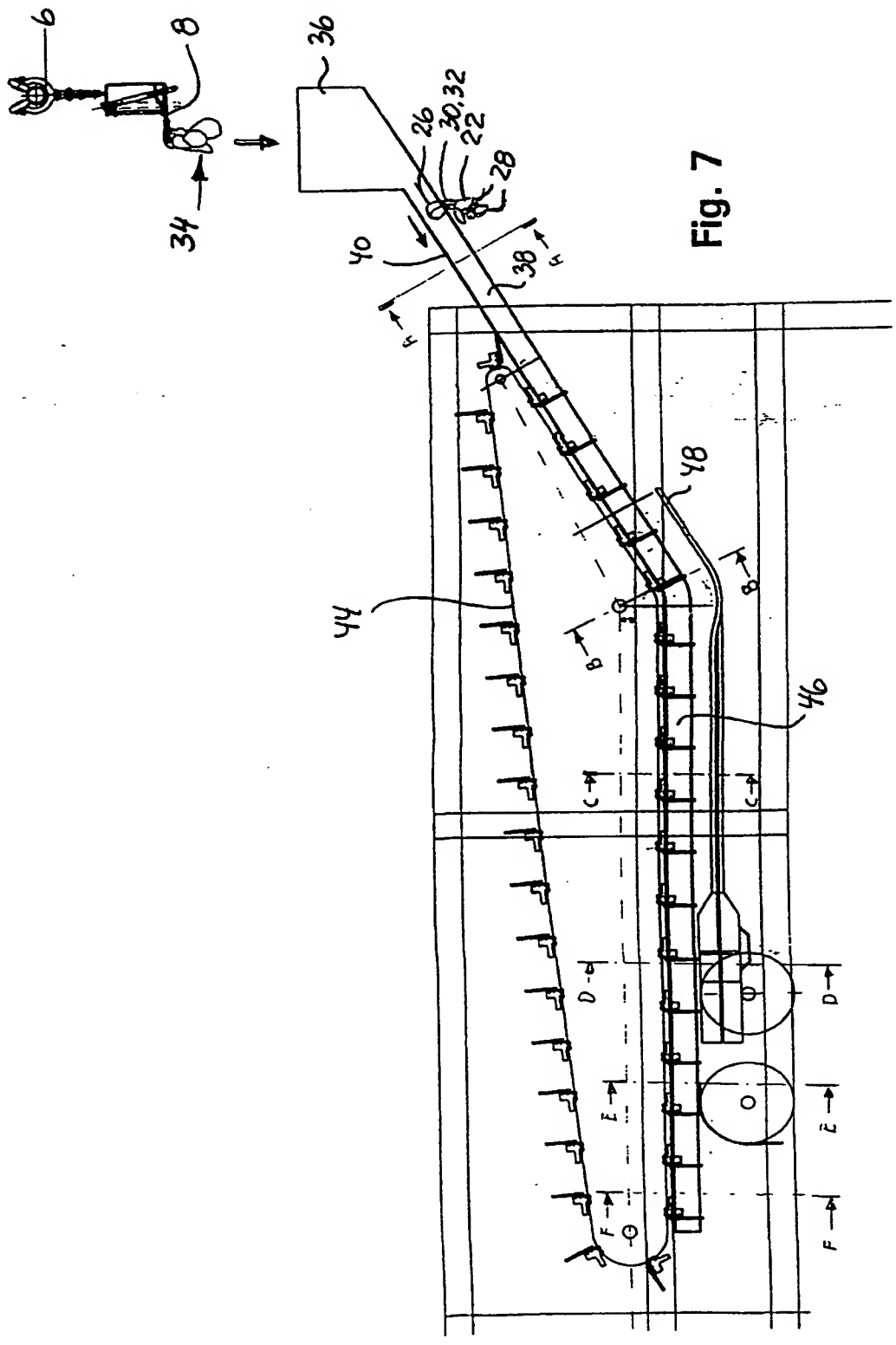

Fig. 7

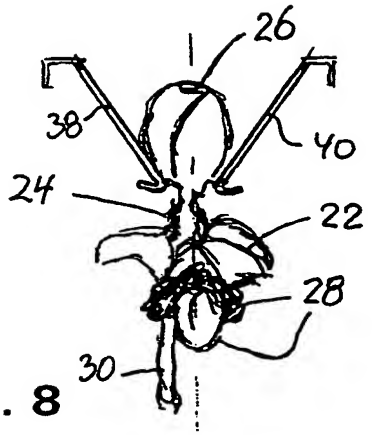

Fig. 8

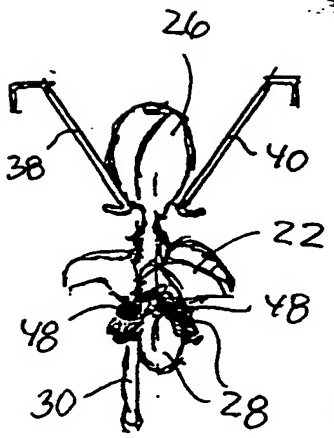

Fig. 9

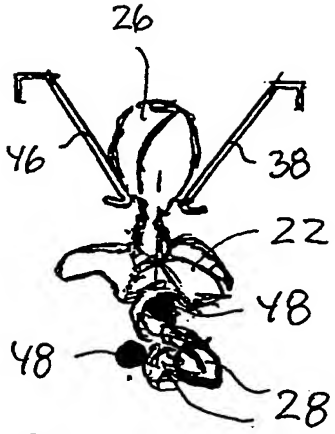

Fig. 10

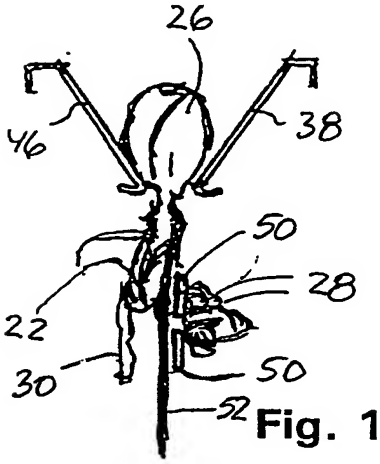

Fig. 11

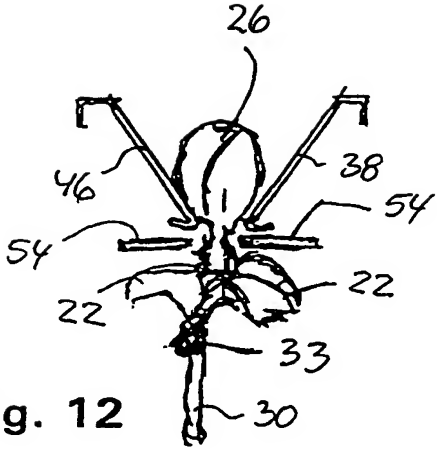

Fig. 12

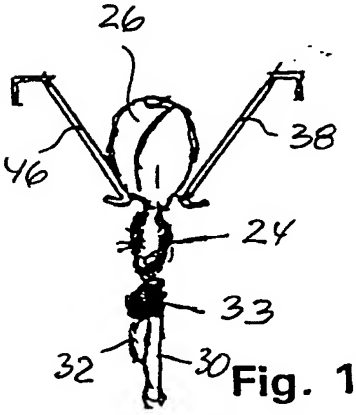

Fig. 13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 99/00685

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A22C 21/06
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A22B, A22C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 587253 A2 (STORK PMT B.V.), 16 March 1994 (16.03.94) --	
A	GB 2004175 A (BOERGE CRISTIAN ANDERSEN), 28 March 1979 (28.03.79) --	
A	US 5152715 A (VAN DE EERDEN ET AL.), 6 October 1992 (06.10.92) --	
A	US 5186678 A (CONNER ET AL.), 16 February 1993 (16.02.93) --	

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
14 March 2000	17 -04- 2000
Name and mailing address of the ISA: Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Magnus Thorén/AB Telephone No. +46 8 782 25 00

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5318428 A (MEYN), 7 June 1994 (07.06.94) -- --------	

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No.
PCT/DK 99/00685

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